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ABSTRACT

The United States Training and Employment Service General Aptitude Test Battery (GATB), first published in 1947, has been included in a continuing program of research to validate the tests against success in many different occupations. The GATB consists of 12 tests which measure nine aptitudes: General Learning Ability; Verbal Aptitude; Numerical Aptitude; Spatial Aptitude; Form Perception; Clerical Perception; Motor Coordination; Finger Dexterity; and Manual Dexterity. The aptitude scores are standard scores with 100 as the average for the general working population, and a standard deviation of 20. Occupational norms are established in terms of minimum qualifying scores for each of the significant aptitude measures which, when combined, predict job performance. Cutting scores are set only for those aptitudes which aid in predicting the performance of the job duties of the experimental sample. The GATB norms described are appropriate only for jobs with content similar to that shown in the job description presented in this report. A description of the validation sample is also included. (AG)

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TECHNICAL REPORT

ON

STANDARDIZATION OF THE GENERAL APTIUDE TEST BATTERY

FOR

ROUTEMAN, WHOLESALE DAIRY PRODUCTS (dairy prod.) 1-80.06

B-467 or S-196

U. S. Employment Service in
Cooperation with
California State Employment Service

September 1962

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STANDARDIZATION OF THE GENERAL APTITUDE TEST BATTERY

FOR

ROUTEMAN, WHOLESALE DAIRY PRODUCTS 1-80.06

B-467 or S-196

Summary

The General Aptitude Test Battery, B-1002-A, was administered to a sample of 110 Routemen, Wholesale Dairy Products 1-80.06 employed by the Knudsen Creamery Company, Los Angeles, California, for the purpose of developing occupational norms for this occupation. The criterion consisted of supervisory ratings based on a descriptive rating scale. On the basis of mean scores, standard deviations, correlations with the criterion, job analysis data, and their combined selective efficiency, Aptitudes G-Intelligence, N-Numerical Aptitude, and Q-Clerical Perception were selected for inclusion in the test norms.

GATB Norms for Routeman, Wholesale Dairy Products 1-80.06 B-467 or S-196

Table I shows, for B-1001 and B-1002, the minimum acceptable score for each aptitude included in the test norms for Routeman, Wholesale Dairy Products 1-80.06.

TABLE I

Minimum Acceptable Scores on B-1001 and B-1002 for B-467 or S-196

B-1001			B-1002		
Aptitude	Tests	Minimum Acceptable Aptitude Score	Aptitude	Tests	Minimum Acceptable Aptitude Score
G	CB-1-H CB-1-I CB-1-J	100	G	Part 3 Part 4 Part 6	95
N	CB-1-D CB-1-I	115	N	Part 2 Part 6	110
Q	CB-1-B	85	Q	Part 1	85

Effectiveness of Norms

The data in Table V indicate that 18 of the 31 poor workers, or 58 percent of them, did not achieve the minimum scores established as cutting scores on the recommended test norms. This shows that 58 percent of the poor workers would not have been hired if the recommended test norms had been used in the selection process. Moreover, 57 of the 70 workers who made qualifying test scores, or 81 percent, were good workers.

I. Problem

This study was conducted to determine the best combination of aptitudes and minimum scores to be used as norms on the General Aptitude Test Battery for the occupation of Routeman, Wholesale Dairy Products 1-80.06.

II. Sample

The General Aptitude Test Battery, B-1002 A, was administered during the period February 2 to February 11, 1960 to a sample of 125 Routemen employed by the Knudsen Creamery Company, Los Angeles, California. Fifteen workers were excluded from the sample. Four because length of supervision precluded obtaining valid ratings. Four because they were unable to understand and follow instructions. Three because of physical disabilities, were unable to perform on apparatus tests. Three because of language difficulty and one because he forgot to bring his glasses. Therefore, the final sample consisted of 110 male routemen.

Job applicants are required to complete a work application form and have an oral interview. The company prefers to hire applicants from 22 to 35 years old, with some selling experience, but with no experience as a Routeman. There are no educational requirements. Applicants must be able to speak, read and write English. On-the-job training is utilized and the average length of time in training is 6 months. All workers in the sample are considered experienced workers.

Table II shows the means, standard deviations, ranges, and Pearson product-moment correlations with the criterion for age, education, and experience.

TABLE II

Means (M), Standard Deviations (σ), Ranges, and Pearson Product-Moment Correlations with the Criterion (r) for Age, Education, and Experience

N = 110

	M	σ	Range	r
Age (years)	35.1	7.4	23-57	.041
Education (years)	11.8	1.2	8-15	.111
Experience (months)	65.8	60.0	8-295	.108

** Significant at the .01 level
* Significant at the .05 level

There is no significant correlation between age, education, or experience and the criterion. The data in Table II indicate that the sample is suitable for test development purposes with respect to age, education and experience.

III. Job Description

Job Title: Routeman, Wholesale Dairy Products 1-80.06

Job Summary: Drives truck over a predetermined wholesale route to deliver and sell dairy products to retail stores, restaurants and hospitals. Counts dairy products preloaded in truck and signs requisition order. Arranges route book for deliveries to be made. Drives to each establishment, determines quantities of each product left over, removes any item too old as indicated by code, rearranges remaining stock and ascertains amount of dairy products required to replenish customer's usual stock. Prepares order, selects items on truck needed to fill order, stocks shelves, stores in walk-in box, or leaves for customer to stock.

IV. Experimental Battery

All of the tests of the GATB, B-1002A, were administered to the sample group.

V. Criterion

The criterion consisted of supervisory ratings made on a descriptive rating scale tailored to the occupation. Independent ratings were obtained from first and second line supervisors for each worker. The rating scale consisted of eight items with five alternatives for each item. The alternatives indicated the degree of job performance attained. Weights of one through five were assigned to each alternative so that the minimum possible score was eight and the maximum forty. The coefficient of reliability between the two ratings was .649 indicating that to some extent, they measured different aspects of job performance.

Pearson product-moment correlations were obtained with the aptitudes for each criterion separately. Significant correlations were found between four aptitudes and the first line supervisory ratings, whereas, only one aptitude correlated significantly with the second line supervisory ratings. Therefore, the final criterion consisted of the first line supervisory ratings. The distribution of the scores ranged from 14 to 40, with a mean of 27.382 and a standard deviation of 5.960.

VI. Qualitative and Quantitative Analyses

A. Qualitative Analysis:

The job analysis indicated that the following aptitudes measured by the GATB appear to be important for this occupation.

Intelligence (G) - to acquire and retain knowledge of products, unit cost, company policy and keeping and maintaining accounts and records.

Numerical Aptitude (N) - required to compute unit cost, discount, total cost, collect payment and make change; to compute day's sales and to determine merchandise needed the following day.

Clerical Perception (Q) - required to count merchandise preloaded in truck, checking off requisition order, to prepare bills and perform related clerical duties.

Manual Dexterity (M) - required to remove items and check freshness code, rearrange stock, select items needed to fill order and to stock shelves and display cases.

On the basis of the job analysis data, none of the aptitudes were considered obviously unimportant for performing the duties of this job and are considered "irrelevant" aptitudes.

B. Quantitative Analysis:

Table III shows the means, standard deviations, and Pearson product-moment correlations with the criterion for the aptitudes of the GATB. The means and standard deviations of the aptitudes are comparable to general population norms with a mean of 100 and a standard deviation of 20.

TABLE III

Means (M), Standard Deviations (σ), and Pearson Product-Moment Correlations with the Criterion (r) for the Aptitudes of the GATB

N = 110

Aptitudes	M	σ	r
G-Intelligence	109.0	13.4	.208*
V-Verbal Aptitude	103.8	15.4	.086
N-Numerical Aptitude	112.7	13.3	.249**
S-Spatial Aptitude	103.7	17.9	.139
P-Form Perception	105.4	14.8	.175
Q-Clerical Perception	106.3	12.5	.109
K-Motor Coordination	107.6	15.0	.184
F-Finger Dexterity	95.9	17.1	.208*
M-Manual Dexterity	106.0	17.9	.250**

**Significant at the .01 level
*Significant at the .05 level

Aptitudes G, N and K have the highest mean scores and aptitudes G, N, P and Q have relatively low standard deviations. For a sample of 110 cases, correlations of .245 and .188 are significant at the .01 level and the .05 level of confidence, respectively. Aptitudes N and M correlate significantly with the criterion at the .01 level. Aptitudes G and F correlate significantly with the criterion at the .05 level.

C. Selection of Test Norms

TABLE IV

Summary of Qualitative and Quantitative Data

Type of Evidence	Aptitudes								
	G	V	N	S	P	Q	K	F	M
Job Analysis Data									
Important	X		X			X			X
Irrelevant									
Relatively High Mean	X		X				X		
Relatively Low Sigma	X		X		X	X			
Significant Correlation with Criterion	X		X					X	X
Aptitudes to be considered for trial norms	G		N			Q		F	M

Trial norms consisting of various combinations of Aptitudes G, N, Q, F and M with appropriate cutting scores were evaluated against the criterion by means of the tetrachoric correlation technique. A comparison of the results showed that B-1002 norms consisting of G-95, N-110 and Q-85 had the best selective efficiency.

VII. Validity of Norms

The validity of the norms was determined by computing a tetrachoric correlation coefficient between the test norms and the criterion and applying the Chi Square test. The criterion was dichotomized by placing 28 percent of the sample in the low criterion group because this percent was considered to be the unsatisfactory or marginal workers on the basis of information obtained from company officials.
Table V shows the relationship between test norms consisting of Aptitudes G, N, and Q with critical scores of 95, 110, and 85 respectively, and the dichotomized criterion for Routeman, Wholesale Dairy Products 1-80.06. Workers in the high criterion group have been designated as "good workers" and those in the low criterion group as "poor workers."

TABLE V

Validity of Test Norms for Routeman, Wholesale Dairy Products 1-80.06

(G-95, N-110, Q-85)

N = 110

	Non-Qualifying Test Scores	Qualifying Test Scores	Total
Good Workers	22	57	79
Poor Workers	18	13	31
Total	40	70	110

$r_{tet} = .47$ $\quad X^2 = 7.527$

$\sigma_{r_{tet}} = .16$ $\quad P/2 = < .005$

The data in the above table indicate a significant relationship between the test norms and the criterion for the sample.

VIII. Conclusions

On the basis of the results of this study, Aptitudes G, N, and Q with minimum scores of 95, 110 and 85 respectively, have been established as B-1002 norms for the occupation of Routeman, Wholesale Dairy Products 1-80.06. The equivalent B-1001 norms consist of G-100, N-115, and Q-85.

IX. Determination of Occupational Aptitude Pattern

The specific norms established for this study did not meet the requirements for allocation to any of the existing 35 occupational aptitude patterns. The data for this sample will be considered for future groupings of occupations in the development of new occupational aptitude patterns.